EXTERNAL SANITY TESTER EST/DOC

Contents

1 General
1.1 Outline

2 I/O - The Command and Display Panel

3 Handling:h2.Mechanical Setup
3.1 Electrical Connections
3.2 Interface data
3.3 Manual Start
3.4 Survey of Communications:xmp nokeep tab=1.
3.5 Preset Data
3.6 Command and Display Options

4 Commands and Displays:h2.Survey:xmp nokeep tab=1.
4.1 Description

5 Messages:h2.Flash Codes:xmp nokeep tab=1.
5.1 Response Codes

1 General

1.1 Outline

This USER'S MANUAL describes EST/DOC using EST-GEN2 of 1988-09-30.

The *External Sanity Tester*/Dynamic Overload Control contains the Software Package EST-GEN2, which is based on the final version of STG-GEN3 of 1979, extended with block EST.
This block can perform either the function of EST or DOC.
The Hardware used in EST/DOC is essentially identical to
the Hardware used for STG and EMON.:h2.Description

EST/DOC, below referred to as 'EST' unless specified,
consists basically of a Load *Tester* for 16 Lines, on which Test Calls are both originated and terminated. The lines are selected at random. The EST- or DOC-function is determined by the position of an indicator plug. Both functions measure the Dialtone Delay on Test Calls and compare the delay with 2 different sets of 3 preset Limit values.

The Hardware consists of one magazine BFD 326 with 46 PC-board positions and build-in DC/DC Power converters. It can be equipped for either 8 or 16 Line Circuits.

As the first 4 Line Circuits have been utilized as the
Signaling Interface for Alarm- and Acknowledgement
Signaling, this leaves 4 or 12 Line Circuits to be used for testing towards the Switch.
Normal analogue 2-wire subscriber lines must be used.
EST can be used towards any Switching System.

As I/O device a Command and Display panel is provided.
This panel is plugged into the front connectors of its Interface PC-boards in the magazine and forms thus a part of the front of the magazine.
For the Layout of this Frontpanel, see section 2.

All Software is stored in non-volatile PROM and can handle either 'EST' (ALARM) signaling or 'DOC' signaling with Acknowledgement signal reception. All Alarm Output is
filtered, but in larger steps than Alarm Inhibition (Ratio 2:1). For DOC, lower Alarms are integrated in higher ones.
Apart from this ***external*** signaling, the complete power of Call Control, which is inherent to the basic Software Package, is available. All faults encountered during Call Handling are labelled with Real Time, EST-line number, Phone number and Type of Fault and stored in a 32-Cell Message Buffer. This buffer can be displayed, stepped thru and cleared.:np.Also Statistics can be displayed, such as Initiated Calls, Terminated Calls, Faults, Faults per Type and Calls and Faults per Line. Moreover, block EST can dynamically display and step thru an Alarm List for Dialtone delay, indicating
which of the supervized Lines originated any of the three
possible Alarm Levels and display its Filterstatus.
Several other Commands and Supervisory Displays are inherent
to the Basic Software Package.

Normally, EST/DOC is equipped for completely Automatic Start-Up with Remote Control by using a Speed Call Numbering Scheme and by remotely turning on the 48VDC power.
Commands and Displays will then still be available locally.

If Automatic Start-Up is not provided or not used, a simple Manual Start-Up can be made from the Command panel.
In both cases all Data can be changed manually at any time.

All Outgoing and Incoming Signaling for Alarms and
Acknowledgement is established thru Loops with Negative Logic to safeguard against Line Failure.

Apart from the 48VDC Power and the 4 or 12 Test lines, the EST has no other connections with the Switch (or Switches) it is supervising.

The Processor used in EST/DOC is the highly reliable
Ericsson AXE-RP1, configured for a Stand-Alone Function
with a unique Operative System and Micro Program. It contains 14K8 PS in PROM and 2K8 DS in RAM, both inherently
Self-Checking. Optionally, a Program Package T-EST,
consisting of one PC-board, is available, to test all the
Hardware Functions in EST/DOC. If the T-EST board - when
not in use - is stored in EST, it will in its turn be
included in the checking routines of EST itself.
For further details, see separate Description.

2 I/O - The Command and Display Panel

The Layout of the Command and Display Panel is given on the next page. The use of it is described in the text and

under Section 4 - Commands and Displays.:np.:xmp nokeep tab=0. +----------+ I I I +----+----+----+----+----+----+----+----+----+----+ I I I I I I I I I I I I I I I I I 01 I 02 I 03 I 04 I 05 I 06 I 07 I 08 I 09 I 10 I I I I I I I I I I I I I I I I I I +----+----+----+----+----+----+----+----+----+----+ I I -O- I I not +----+----+----+----+----+----+----+----+----+----+ I I acc I I I I I I I I I I I I I I I 11 I 12 I 13 I 14 I 15 I 16 I 17 I 18 I 19 I 20 I I I I I I I I I I I I I I I I I +----+----+----+----+----+----+----+----+----+----+ I I I I +----+----+----+----+ I I I I I I I I I -O- I #1 I #2 I #3 I #4 I I I # I I I I I I I +----+----+----+----+ I I I I +----+----+----+----+ I I I I I I I I I -O- I #5 I #6 I #7 I #8 I I I # I I I I I I I +----+----+----+----+ I I I I ..... I I -O- -O- -O- -O- -O- -O- -O- -O- . . . . . I I conf rest time lim1 lim2 . dot. # .clmp.exec. I I -K- -K- -K- -K- -K- -K- -K- -K- ..... I I . . . . . I I -O- -O- -O- -O- -O- -O- -O- -O- -O- . 0 . 1 . 2 . 3 . I I tonc dtsr cara regq supv ttyp star stop ..... I I -K- -K- -K- -K- -K- -K- -K- -K- . . . . . I I . 4 . 5 . 6 . 7 . I I -O- -O- -O- -O- -O- -O- -O- -O- ..... I I subd link bloc debl ston calc stfb . . . . . I I -K- -K- -K- -K- -K- -K- -K- -K- . 8 . 9 . A . B . I I ..... I I -O- -O- -O- -O- -O- -O- -O- -O- -O- . . . . . I I disp scan comp soff . C . D . E . F . I I -K- -K- -K- -K- -K- -K- -K- -K- ..... I I I +----------+ 20 Decimal Displays, numbered 01 - 20 8 Hexadecimal Displays, numbered #1 - #8 32 LED's for Commands, indicated with '-O-' 32 Keys for Commands, indicated with '-K-' 20 Parameter keys, indicated with dot, #, clmp, exec and 0 - F 3 LED's for 'not acc' and '#'

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3 Handling:h2.Mechanical Setup

>>> CAUTION <<<

The Hardware in EST/DOC is dependent on the free flow of cooling air. If the magazine is not placed in an Ericsson AXE-cabinet, please observe that the flow of cooling air thru the magazine must not be obstructed by placing it e.g. flat on a table surface or placing a flat object on top.

A CLEARANCE OF 1" AT THE BOTTOM AND TOP IS SUFFICIENT.

3.1 Electrical Connections

The front-connectors with which some PC-boards in EST have been equipped, are divided in an upper and a lower half, below referred to as 'A' and 'B'. Each half is divided in 4 plug positions, below referred to as '1' to '4'. Thus 'A1' indicates the upper half's upper plug position. Moreover the PC-boards have a position number in the magazine, 01 to 47. Thus 5A1 indicates a plug position on the CCB-board.

1. Plug in the Command/Display Panel in the frontconnectors of the PC-boards MLDE and MEDE, pos.35 and 47.

2. Use the shorter bus cable (TSR 204 0301/200) and plug in between 22A2-4 and 23A2-4. Remove the lids on both plugs.

3. Use the longer bus cable (TSR 204 0301/400) and plug in between 29A2-4 and the plug at 23A2-4.

4. Use the bus termination plug (RNV 991 235/001) and plug in on the plug at 22A2-4.

5. Use the address plug RNV 991 04/1 and plug in 23A1.

6. Use the address plug RNV 991 04/2 and plug in 22A1.

7. Use the indicator plug RNV 991 212/006 and plug in: a) To configure the machine as 'EST': 05B1. b) To configure the machine as 'DOC': 05B2. (The Acknowledgement Signaling Input will then be plugged into 05B1, see below.) NOTE: Changing the position of the plug during service causes a Restart.

8. Optionally, use the 2 Monitor cables (color: RED) and plug one side into the 2-pole jack (10B4) in the AMPFI board. The other side of the Monitor cable can be plugged into any line circuit (pos.16, 17 or 20) to monitor a line circuit via the loudspeaker. The upper 3 keys on the AMPFI-board (B1, 2, and 3) will function as a digital volume control ('IN' =0). The lowest key (B4) should always be locked in the 'IN' position.

9. Use 2 Power cables (e.g.TSR 211 0201/1200) to connect the -48V to the 2 DC/DC converters. Plug one side of each into 01B3 and 25B2. The upper pin carries -48V, the lower 0V. Totally ca. 2 amp. 48VDC is required. (Voltage limits 30-70V).

10. Connect the frame of the magazine to the frame of the cabinet or 0V.

11. All other connections are made to the CCB-board (pos.5): a) Outgoing ALARM/DOC signaling to A1. b) Telephone lines 5-8 to A2, 9-12, 13-16 to A3,A4. c) For DOC, the incoming Acknowledgement Signaling must be plugged into B1 and the indicator plug into B2. (see also para 7 above). d) B3 and B4 are not connected.:xmp nokeep tab=0. Disposition of each plug position on the CCB-board ---------- Front view For A1-4: Pin 1,2 = loop 1 1 = tip, 2 = ring +------+ Pin 3,4 = loop 2 3 = tip, etc. I 1 3 I Pin 5,6 = loop 3 I I Pin 7,8 = loop 4 I 2 4 I I I For A1: loop 1,2 and 3 = Alarm 1, 2 and 3. I 5 7 I Alarm 1 = 'A3', 2='A2', 3='A1'. I I loop 4 = Acknowledgement alarm and I 6 8 I 'NOT RUNNING'-Alarm. +------+ For A2-4: loop 1 - 4 = line 5-8, 9-12, 13-16. For B1,2: pin 1, 3, 5 and 7 = TP1, 2, 3 and 4. TP1-3 used for Ackn. Signaling. TP4 used for Software switching. For B1: pin 2, 4, 6 and 8 connected to 0V. For B2: pin 2, 4, 6 and 8 connected to +5V.

3.2 Interface data

Identical Interface Hardware has been used for Alarm Output and Telephone Lines.

Loop features for Alarm and Telephone Lines.

Electronic contact, current limited to ca.30mA, else
ca.600 ohms. OPTO-coupler isolated and controlled.
Can switch DC or AC. In open position ca.100 kohms,
designed for 600VDC and surge 2KV.

Loop features for Telephone Lines.

Normal 2-wire Analogue Subscriber lines.
Each line can be defined by command as either A-sub or
B-sub or both. 'Both' is set at Aut.Start in EST/DOC.

When used as A-sub -
Sending of Loop closure/Loop opening.
Sending of DTMF (Aut.Start), DTMF or Dialpulse (Man.Start).
Sending and reception of Test tone (ca. 1 kHz).
Reception of Tone Characters and analysis of 5 different
Tone/Pause Element times and time tolerances or continuous
Tones for: Dialtone, 2nd Dialtone, Ringing tone and
4 different Code Answers. (ca. 200 Hz - 1600 Hz).

When used as B-sub -
Sending of Loop closure/Loop opening.
Sending and reception of Test tone (ca. 1 kHz).

Reception of Ringsignal Characters and analysis of
1 to 5 Ring/Pause Element times and time tolerances.
(ca. 20 - 100 Hz).

Loop features for Alarm Output.

Negative Logic, normally closed, Open Loop = Alarm.
When the loop is fed with 20VDC it will drive a 1kohm relay
with 12mA.
'Power Failure' emits uninterrupted Alarm on all 4 Outputs.
Alarms 1-3 are individually interrupted between the 29th and
30th second after their initiation or previous interruption
for both EST and DOC.

Loop features for Acknowledgement Signal Input.

Negative logic, normally closed, Open Loop = Signal.
External loop MUST be isolated from ***external***
ground, voltage or noise.
Open = >20 kohm, closed = <100 ohm.
The Acknowledgement Checking for DOC allows a phase lag of
2 seconds before Alarm 4 is emitted.:np.:h2.Automatic Start

1. Switch on the 48V power by using one of the following
methods: a) Simultaneously for both power units (can be done remotely) b) Individually per power unit (simultaneously within 2 seconds) c) First the LEFT power unit: (lock the key in the 'IN'- position) Then the RIGHT power unit: (flip the toggle switch)

Note that 'Handling' for Automatic Start only consists of switching on the 48VDC power. The string of events triggered at 'Power On' is described below.

2. 'F01' will initially be blinking on the Display panel. If 'F01' changes to 'F02' after 2.5 seconds, your EST has started automatically and is now in service. If 'F01' continues on the Display, EST has not been equipped with Automatic Start. Proceed as described under 3.5 below.

3. Another 2.5 sec after 'F02' has started blinking on the Display, a check of all 12 lines will be performed, starting from line 16 downwards to line 5. For each line will be checked: a) If the Line Interface boards have been inserted. b) If a tone is received within 10 sec. after Loop closure. c) If this tone is a continuous tone (Dialtone) for 2 sec. d) If the line passes the test, that line is deblocked in the EST data.

4. At Automatic Start the Real Time Clock is set to '00.00.00'. The Clock can be reset manually at any convenient event without stopping EST or affecting its performance, by using command: TIME hh.mm.ss EXEC. Remotely, the Clock can only be set correctly by ordering a remote Power-Up at midnite. Note that a Restart does not influence the Clock.

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5. If all lines have been tested and only none or one line has been deblocked, a new Restart is made with reload. This will continue until more than 1 line passed the test. If 2-6 lines have been deblocked, the Call Rate is set to 4 (=6 Calls/Minute), if 7-12 lines have been deblocked, the Call Rate is set to 5 (=15 Calls/Minute). In both cases, the 'Peak Factor' is set to 8, to 'cluster' the Calls together in time with the aid of a Random Number Generator (0-15). Details can be found under command 'CARA'. The DTMF speed is reduced from 50ms tone/70ms pause to 100ms tone/50ms pause. After this the machine clears the blinking 'F02' on the display, clears ALARM4 and starts the initiation of Calls. If this Start Function fails internally, a Restart is made with reload and the entire procedure will be repeated.

The clearing of ALARM4 (LED4='ON'), indicates that EST/DOC has started 'CALL HANDLING'.

6. When Data must be changed after that an Automatic Start has been performed, this can be done AFTER that ALARM4 has been cleared. Key: STOP EXEC, and proceed as described under 3.5 below. Note that all changed Data will be returned to their original settings, when a Restart or a new Automatic Start is performed.

7. In order to automatically take-in or -out of service repaired/faulty lines, a Restart with reload will be performed every 24 hours at 1 second before midnite, provided that: a) The machine has been configured for EST, not DOC. b) An Automatic Upstart/Restart has been successfully performed previously. c) Less than 12 lines were deblocked previously. d) The clock value for which this event is triggered is 23.59.59. If the Internal Clock has not been set correctly, this event will occur at another time during the day. Note that a Restart does not influence the Clock, only a 'Power On' will set it to 00.00.00.

8. At the return of power after a power failure, it is sufficient that both power units start electrically simultaneous, so the switches on the power units must be left in the 'ON'-position. Then a new Automatic Start will be made at the return of power.
(See also Section 5.1, Note for Parity Failure F05).

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9. The Telephone Numbers that are loaded for lines 5-16

are 21# - 29#, 31# - 33#, corresponding to a Speed Call list. Translation to regular phone numbers must have been inserted previously for all connected lines into the Switch or Switches. For Ericsson AXE Switches, see the attached description, 1/1553-BFD 326 510, 'AXE TRANSLATIONS FOR THE *EXTERNAL SANITY TESTER*'.
The Speed Call numbers can be replaced with other numbers with the command SUBD.
A Restart will however reload the Speed Call numbers.

10.The criterium for Automatic Start/Manual Start for EST/DOC is that 2 programmed PROM-IC's have been inserted on Program Page 15 (Pos.15 and 16 on PC-board ROF 132 143/2462 R3A). If these are removed from their sockets or replaced by unprogrammed ones, the EST/DOC will automatically revert to Manual Start.

3.3 Manual Start

Detailed information can be obtained for the different commands and parameters from the description in Section 4.

1. Switch on the 48V power as for Automatic Start.

2. F01 will blink on the display - press CLMP

3. Key: TIME hh.mm.ss EXEC (24h clock) - press CLMP

4. Key: CARA 4 EXEC (for 2-6 lines, CARA 5 EXEC for 7-12 lines, see also command 'CARA').

5. Key: SUBD 5.3.2.(phone number) EXEC - press CLMP

6. Repeat 5. for all connected lines: SUBD 6..., SUBD 7...

(Note: Up to max. SUBD 16..., Lines 1-4 used as
DOC/ALARM signaling interface).

7. Key: START 0 EXEC - and your EST will be in service.

3.4 Survey of Communications:xmp nokeep tab=1.

+----------+------+ I Alarm Port in EST/DOC, LED-Nr. ---------> 1 2 3 4 I DisplI I Connected to Alarm Type,()=Recommended -> Mi Ma Cr (Ma)I FlashI I 'A3'= Minor,'A2'= Major,'A1'= Critical -> A3 A2 A1 (A2)I Code I +----------+--------------+------+

I POWER OFF I X X X X I - I +----------+--------------+------+

I POWER ON I I I I Aut.Upstart+Load (<30ms+pause 2.55sec) I Cl Cl Cl X I F01 I I Aut.Restart+Reload (<30ms+pause 2.55sec)I Cl Cl Cl X I F02 I I Aut.Interface and Line Test (12-120sec) I - - - X I F02 I I Aut.Call Rate and Peak Factor) I - - - X I F02 I I Aut.reduced DTMF-speed) I - - - X I F02 I I Aut.Clear Flash Code) I - - - X I Cl I I Aut.Start) (<1ms) I - - - ClI - I I I I I I Man.Upstart+Load Basic Data (<30ms) I Cl Cl Cl X I F01 I I Man.Clear Flash Code (Command CLMP) I - - - X I Cl I I Man.Load (Several Commands SUBD, CARA) I - - - X I - I I Man.Start (Command START) I - - - ClI - I +----------+--------------+------+

I Man.Restart or Aut.Restart+Reload(<30ms)I Cl Cl Cl X I F02 I I Then see further 'Power On' I I I +----------+--------------+------+

I MANUAL STOP (Command: STOP) I Cl Cl Cl X I - I +----------+--------------+------+

I MANUAL START (Command: START) I - - - ClI - I +----------+--------------+------+

I EST, Passed Dialtone Delay Limits I I I I --- (One or more lines or combinations I I I I thereof, Alarms individually inter- I I I I rupted 1sec each 29th sec). I I I I Limit 1 I X - - - I - I I Limit 2 I - X - - I - I I Limit 3 I - - X - I - I +----------+--------------+------+

I DOC, Passed Dialtone Delay Limits I I I I --- (One or more lines or combinations I I I I thereof, alarms individually inter- I I I I rupted 1sec each 29th sec). I I I I Limit 1 I X - - - I - I I Limit 2 I X X - - I - I I Limit 3 I X X X - I - I I Acknowl.Fault,any Alarm1-3,ON or OFF I(X) (X) (X) X I - I +----------+--------------+------+ 'X' = Alarm 1-4 'ON' = Open Loop. 'F01','F02'= Flashing Display 'Cl'= Cleared, Alarm 1-4 'OFF' = Closed Loop. Flash Code cleared '-' = Alarm 1-4 'OFF' = Closed Loop. No Flash Code displayed.

Note: An Aut.Restart caused by 'Parity Failure' in DS or 'Program Handling Alarm' in PS will display Flash Code 'F05' resp.'F04'.

For DOC, a closed Alarm1-3 loop must be acknowledged within 2sec with a closed acknowledgement loop, and v.v., else Alarm4 will be emitted during the time this condition is not true. Thus - the 1 sec break in the Alarm could be 'bridged' with the 2 sec ackn. phase shift, reason why such an Ackn.fault is memorized during the next 29 sec and Alarm4 emitted. Only if the Alarm ceases or when the next
acknowledgement is correct, Alarm4 will be cleared when such a 'bridging' condition occurred.

3.5 Preset Data

If EST/DOC is equipped with Automatic Start, all Initial Data is kept in PROM and is at Upstart or Restart transferred

to DS-RAM. Some Initial Data for Automatic Start is segregated for EST or DOC. For Manual Upstart most of the Initial Data can be used and only a small portion must be set by commands via the Command Panel, e.g. the Telephone Numbers.

All Data can be changed by Commands in both cases. A Restart however will return all changed Data to their original settings - with only one exception: the Real Time Clock will not be changed. This also means that, when only Manual Start is provided and a Restart is made, all Telephone Numbers have to be reloaded by commands.

All preset Initial Data and their initial values are described under Section 3.8, together with the commands with which the values can be changed.

For a complete description of each Command or Display,
see Section 4.

3.6 Command and Display Options

The numbering of the Subsections below corresponds to the numbering of the Commands in Section 4.1.

0. Configuration (CONF)

The Configuration in EST/DOC is preset to 2.1.0 and should only be displayed, not reset.
'2' meaning EST/DOC
'1' meaning 16 Lines
'0' meaning International Dial (1,2...9,0)
Do not attempt to reset the Configuration. Changing the '2' will crash Program Handling (remedy: Power Down) or cause a Restart. Changing '1' or '0' will cause a Restart, resetting the initial values.

1. Manual Restart (RESTA)

In EST/DOC only RESTA 0.0 EXEC (or RESTA 2.1 EXEC) should be used. All other options will be treated as an attempt to change the Configuration. See above.

2. Real Time Clock (TIME)

At Upstart (Power On) the Clock is cleared, (= set to 00.00.00 = midnite, 24h clock) and is kept in a DS-region, not cleared at Restart. The Clock can be reset by Command TIME at any convenient event or by a Power Up at exactly midnite. As the Clock is used to label all Messages in the Message Buffer and also to initiate the 24h Restart at midnite for EST (see Section 3.4, para 7), it is good practice to check the Clock e.g. each month.

3. Not used, plugged in EST

4,5. Dialtone Delay Limits 1 and 2 (LIM1, LIM2)

These Limits are preset to the following values at
Power Up or Restart and can not be displayed -
EST, Aut.Start: Limit 1 = 5 sec, Limit 2 = 10 sec
DOC, Aut.Start: Limit 1 = 1 sec, Limit 2 = 2 sec
EST/DOC, Man.Start: Limit 1 = 5 sec, Limit 2 = 10 sec

To identify a tone as 'Dialtone' (=continuous tone), a
certain time is needed from the moment the tone starts.
Dialtone Delay however is defined as the time that elap-
ses between Loop Closure and the beginning of the tone.:np. The 'Identification Time' has in EST/DOC been preset to
2 sec. The discrepancy has been solved by always adding
2 sec to the requested Limits.

-EXAMPLE-
Requested Limit = 5 sec
Value, set in Data = 5 sec + 2 sec ID time = 7 sec
-RESULT-
A Dialtone that starts 4.9 sec after Loop Closure is
approved being within the 5 sec Limit at 6.9 sec after
Loop Closure, however - if it had started at 5.1 sec
after Loop Closure - it is marked as 'passed Limit 5 sec'
at 7.0 sec after Loop Closure.
When entering new values for Limit 1 or -2, the ID-time
of 2 sec can be disregarded and is automatically added.
Note however that the ID-time AND Limit 3 can be changed
by Command TONC (see below).
CAUTION - Changing the ID-time with TONC will upset the
------- Limit approval scheme for Limit 1 and Limit 2.

Both Limit 1 and Limit 2 can be set in the range 1-15 sec
in steps of 1 sec. However Limit 2 MUST be at least
1 sec greater than Limit 1. As EST also calculates the
difference between Limit 1 and Limit 2 for each of the 2
commands, the sequence of the commands can be important.
-EXAMPLE-
Limit 1 preset to 5 sec, Limit 2 to 10 sec
Limit 1 to be changed to 12 sec, Limit 2 to 15 sec
Entering the new Limit 1 first, will result in
'Not Accepted' as 12>10. Enter first Limit 2 = 15 sec
as 15>5 and then Limit 1 = 12 sec, as 12<15.
Response Code '0' means 'Accepted' and is to be cleared
with CLMP.

The Limits can only be reset when Call Handling has
been stopped with Command STOP.

There is no check made between Limit1,2 and Limit3.
Naturally Limit 3 MUST be greater than Limit 2. Please
keep this in mind when changing Limit 3 with Command TONC

6,7. Not used, plugged by the Configuration 2.1.0

8. Tone Character Data (TONC)

All Tone Character Data are preset in EST/DOC, with
differences between EST and DOC. Please refer first to
the full Command Description in Section 4.2 and observe
also the instructions for Limit1,2 above.:np. The Identification Time for Dialtone and Limit 3 for
Dialtone delay can be displayed with the Command -

TONC 1.1 EXEC CAUTION - Key 'ONE DOT ONE'

For EST/Aut.Start will be displayed 1.1.200.0.0.2700
For DOC/Aut.Start will be displayed 1.1.200.0.0.500
For Man.Start will be displayed 1.1.200.0.0.2700
(disregarding Leading Zeroes)

-EXPLANATION-
1 = Dialtone
1 = First Element
200 = Identification Time, 200 x 10 ms = 2 sec
0 = Continuous Tone
0 = End of Data (1 Element only)
2700 (EST) = Limit 3 for Dialtone delay =
2700 x 10 ms - 2 sec = 25 sec
500 (DOC) = Limit 3 for Dialtone delay =
500 x 10 ms - 2 sec = 3 sec

-EXAMPLES-
Change for EST Limit 3 to 21 sec
TONC 1.1.200.0.0.2300 EXEC
Change for DOC Limit 3 to 5 sec
TONC 1.1.200.0.0.700 EXEC

CAUTION - ADHERE TO THE FOLLOWING RULES -
Never change the ID-time '200' (= 2 sec)
It will destroy the Limit1,2 approval scheme
Make certain that Limit 3 is at least 1 sec
greater than Limit 2
Always ADD the ID-time to Limit 3 by Command
TONC 1.1.200.0.0.((Limit3 x 100) + 200) EXEC
Never use the Command TONC 1 EXEC
It resets the Dialtone Data to undesired values

EST/DOC is preset to identify only one Ringtone Element
and one Ringsignal Element, as testing of these signals
is not the prime task of EST. These preset Data can NOT
be displayed with the Commands -
TONC 3.1 EXEC for Ringtone and
TONC 4.1 EXEC for Ringsignal
However the Data corresponds to as if the following
Commands had been entered -

TONC 3.1.66.0.0.1100 EXEC for Ringtone and
TONC 4.1.66.0.0.1100 EXEC for Ringsignal:np. -EXPLANATION-

3 = Ringtone, 4 = Ringsignal
1 = First Element
66 = Minimum accepted length of Tone or Signal
66 x 10 ms = 660 ms
0 = Uninterrupted Tone or Signal
0 = End of Data (1 Element only)
1100 = Total Recognition Time, 1100 x 10 ms = 11 sec

Preset data are also available to identify 2 Tone Elements and/or Signal Elements. Simply key -

TONC 3 EXEC and/or TONC 4 EXEC

After this the Commands -

TONC 3.1 EXEC and TONC 3.2 EXEC (and 4.1 and 4.2)

will display, disregarding Leading Zeroes -

3.1.66.300.4.434 and 3.2.66.150.0.1100 (or 4 etc.)

For further explanation, see Section 4.2, 'TONC'

The TONC-Commands that SET (not display) Data can only be used when Call Handling has been stopped with Command STOP.

9. Dial Pulse and DTMF Data (DTSR)

All Lines 5-16 can be individually marked to use either Dialpulse or DTMF, see Command SUBD.

Note 1 - If EST/DOC is equipped for Aut.Start, a Poundsign (#) is used in the Speedcall List. '#' can only be sent with DTMF, reason why in the case of Aut.Start all Lines are marked to use DTMF.

Note 2 - Do not use the Command DTSR C.0 EXEC when Speedcall Numbers are used.

Dialpulse and DTMF Data are preset in EST/DOC and is adhered to by all Lines.

Dialpulse - 10 pulses per second (limits 7-22)
Make Ratio 40 percent (limits 20-80)
Break Ratio 60 percent (limits 80-20)
Interdigital Pause 400 ms (lim.100-999)
DTMF - Aut.Start - 100 ms Tone, 50 ms Pause
Man.Start - 50 ms Tone, 70 ms Pause
(limits for Tone - 10-100, for Pause - 50-990):np. Note 3 - To enter new Dialpulse Data, it is sufficient to enter 'Speed' and 'Ratio in percent' (provided the sum = 100 percent). The machine will calculate to the nearest 1 ms and program the common pulse

generator - PPG - accordingly. The upper LED on the AMPFI-board indicates the pulse rate. The calculated rate in ms is shown on the display.

Note 4 - As can be seen from above, the DTMF speed is slightly reduced at Aut.Start, as testing of DTMF is not the prime task of EST. It is good practice to set identical DTMF Data at Man.Start with the Command - DTSR C.100.50 EXEC

These Data can only be reset when Call Handling has been stopped with the Command STOP.

10.Call Rate and Peak Factor (CARA)

Only a part of the extensive Command CARA is described in this Manual, as 'Preordered Runs' and 'Preordered Statistical Printouts' are not relevant in EST/DOC.

All described options can be commanded while Call Handling is in progress. Each change of Data will be reported with a message in the Message Buffer, labelled with code 25 (see Section 6.1).

Initiation of Calls is done with the aid of 2 buffers, value 0-15 each, below referred to as B1 and B2. B1 is incremented by 1, according to the Callrate.

-EXAMPLE-
Callrate is set = 4, meaning 6 Calls/minute
-RESULT-
B1 is incremented by 1 each 10th sec

If the Peak Factor is set = 0 and B2 = 0, the contents of B1 is immediately transferred to B2 and B1 remains consequently = 0.
The Test Administration (Block TADM) will initiate a Call - provided 2 free lines are available - and decrement B2 until B2 = 0. If B1 - when incremented - does not find B2 empty, that Call will remain in B1. If B1 is 'full' (=15) and is incremented, then first so many units are transferred from B1 to B2 that B2 is filled to 15 and the (now reduced) B1 is incremented. If both B1 and B2 are full and B1 is incremented then B1 is cleared and a message is entered in the Message Buffer, labelled with code 24 (see Section 6.1), that 16 Calls have been discarded. This means that the Callrate has been set too high for the number of available Lines.:np. A too low Callrate will have as result that EST will be idle between single Calls. Even if the Lines are selected at random (with a Random Number Generator), EST tends to pick the same connection several consecutive times. This can be prevented by using the

Peak Factor option. If the Peak Factor is reset from
0 to a value 1-15, then, each time B1 is incremented,
the Peak Factor is compaired with a random number
0-15. If the random value is equal to or greater than
the Peak Factor AND B2 is empty, B1 is transferred to
B2, else B1 is only incremented. Also here, some
'safety valves' have been added. This results in
a cluster of Calls (a burst of traffic), occupying
all available Lines, testing all connections and then
- when B2 is empty - EST will be idle for a short time.
Still - the exact Callrate (e.g. 4 = 360 Calls/hour),
is precisely fulfilled.

The Command CARA EXEC will display the Callrate
Code, the Peak Factor and B1 and B2 dynamically,
giving a direct indication if the Callrate or the
Peak Factor should be changed.

Preset Data
At Aut.Start, all Lines will be pre-tested.
If 2-6 Lines are found OK, the Callrate is set = 4
(= 6 Calls/minute). If 7-12 Lines are found OK,
the Callrate is set = 5 (= 15 Calls/minute).
In both cases the Peak Factor is set = 8.
For Man.Start, both Callrate and Peak Factor
remain = 0 and must be set with Command CARA as
described in Section 4.2.

For calculations, the Call Holding time should be
taken into account. In EST/DOC it is preset to
3 sec and cannot be changed.

11.Availability of Switch Path (REGQ)

In earlier Switching Systems, the number of
simultaneous Calls was limited by the number of
Register Functions that could be reached from one
Linegroup. This number can be set in the machine and
is then counted down and up. If the counter reaches
zero, no more Calls will be initiated. In EST/DOC the
number of simultaneous Calls is max. 6 for 12 Lines.
The number has been preset=10 and need not be changed.
This counter can be displayed dynamically with the
Command: REGQ EXEC:np. 12.Call Supervision Time, Disconnection Control (SUPV)

Preset to 120 sec and No Disconnection Control.
For Options, see Section 4.2

13.Test Type, Fault Handling Type (TTYP)

Preset to 4.1 - can be displayed ONLY.
Resetting results in a Restart.

14.Start of Call Handling (START)

For Options, see Section 4.2
In EST/DOC Alarm 4 will be cleared.
Command START 0 EXEC should preferably be used.

15.Stop of Call Handling (STOP)

Will immediately stop Call initiation.
Will complete Calls already initiated.
In EST/DOC the Alarm List and Alarms 1-3 are
cleared and Alarm 4 is emitted (= Man.Stopped).

16.Entering or Display of Telephony Data (SUBD)

Preset Data at Aut.Start -
Lines 5 - 16 loaded with Speedcall Numbers
21# - 29#, 31# - 33#, all Lines blocked in Data.

After loading a check is made on each line if
Dialtone is received within 10 sec after Loop
Closure. The Lines that pass the test are
deblocked in Data.

No Data are set at Man.Upstart. These have to be
set for each Line with Command SUBD. For Options,
see Section 4.2

- IMPORTANT NOTES -

The Pound Sign # cannot be loaded with Command SUBD
Only an Aut.Upstart can load the #
This also means that the Speedcall numbers cannot
be changed. The # can only be sent with DTMF,
see also Command DTSR above.
The # cannot be displayed in Decimal Displays,
as in Data the Hexadecimal value C must be used.
The space of the # is left blank in the display.
The number .21#. is displayed as .21 .
This is also valid for the displays, resulting
from the Command STFB:np. 17.(LINK) Not used in EST, plugged by TTYP 4.1

18.Blocking of Line (BLOC)

Only Line Numbers 5 - 16 can be blocked in EST.

19.Deblocking of Line (DEBL)

Only Line numbers 5 - 16 can be deblocked in EST.
At Man.Upstart, a Line is automatically deblocked
when Data is entered for that Line with Command SUBD
At Aut.Upstart, a Line is automatically deblocked
when it passes the initial Line Test. If it did not

pass the Test and later the Line has been repaired,
it is better to make a Restart and have the Line
checked by EST itself than to deblock the Line.
For the same reason the Command DEBL EXEC should
never be used.

20.(STON) Not used in EST, plugged by TTYP 4.1

21.Display of Statistical Counters (CALC)

All counters can be cleared by using the Command
START 0 EXEC (or by making a Restart)
All Options described in Section 4.2 are
available in EST.

22.Not used, plugged.

23.Display Message from Buffer (STFB)

The Message Buffer can be cleared by using the
Command START 0 EXEC or STFB 0 EXEC
All Options described in Section 4.2 are available
in EST. Please observe the NOTE under Command SUBD
above regarding the display of '#'

24-26.Not used, plugged.

27.Maintenance of Program Store (DISP)

All Options described in Section 4.2 are
available in EST. Please observe, that in EST
PS-pages C and D (and for Man.Start also F) are
not inserted and will display 'FF' as Checksum and
will indicate 'FAULT'. This is normal. The test can
be continued by pressing EXEC. When the test stops
after 16 pages, press CLMP

The T-EST board, mentioned at the end of Section 1.2
can be stored - when not in use - as PS page C and D
and will then be included in the Checksumming.:np. 28.Not used, plugged.

29.Dynamic Display of Data (SCAN)

All Options described in Section 4.2 are
available in EST.

A special form of the Command SCAN has been used to
display the Alarm List in EST/DOC. This list has 12
locations for 12 Lines. It is preceeded by 5 - and
followed by 15 'Border Markers' with value #FF.
In this way the list can easily be found and
identified. It can be stepped thru and the beginning
and the end are clearly marked. Moreover, the last

digit in the displayed address corresponds with the
Line number.

The full command is -

SCAN #02B5 EXEC...(EXEC)

This gives a dynamic display of the Alarm entry for
Line number 5. Pressing EXEC another time will step
the display and the address to line 6, etc.

The display will show -

#00xy

-EXPLANATION-
#00 is irrelevant
x indicates the Alarm Level
y indicates the Filter Status

x can vary between 0 and 3
0 = no alarm
1 = Alarm Level 1 (A3, Minor), passed Limit 1
2 = Alarm Level 2 (A2, Major), passed Limit 2
3 = Alarm Level 3 (A1, Crit.), passed Limit 3

y can vary between 0 and 4
Y is stepped +2 for each fault, max.4
stepped -1 for each Call within Lim1, min.0

If y = 0, 1 or 2, no Alarm = x is emitted
If y = 3 or 4, Alarm = x is emitted

When y reaches 0, x will be cleared too
x can change when y increases
x can only change to 0, when y decreases to 0:np. -EXAMPLE-
Which Switch causes Alarm 2 ???
Step thru the Alarm List and find a '23' or a '24'
When found the address shows (e.g.) #02B9
Thus, Line number 9 emitts Alarm 2
As Line number 9 has Speedcall no. 25#
(translated to e.g. 369-6685), the Switch with more
than 10 sec Dialtone delay has been identified.

30.Compute Hex-Dec and v.v. (COMP)

Available in EST

31.(SOFF) Not used in EST, plugged by TTYP 4.1:np.

4 Commands and Displays:h2.Survey:xmp nokeep

tab=1.

+------------+-------------+---------+-----------------------------+ I Type of I Name I No. I Function I I Command I I I I +------------+-------------+---------+-----------------------------+

I Operative I CONF I 0 I EST and Line Configuration I I System I REST I 1 I Restart I I I TIME I 2 I Control of Real Time Clock I +------------+-------------+---------+-----------------------------+

I EST CommandsI LIM1 I 4 I Limit 1 for Dialtone delay I I I LIM2 I 5 I Limit 2 for Dialtone delay I +------------+-------------+---------+-----------------------------+

I Commands I TONC I 8 I Data on Tones and Signals I I for Test I DTSR I 9 I Data on DTMF and Dialpulsing I I Administra- I CARA I 10 I Data on Call Initiation Rate I I tion I REGQ I 11 I Available Register Functions I I I SUPV I 12 I Call Supervision time and type I I I I I of Disconnection Control. I I I TTYP I 13 I Test type, Fault Handling Type I I I START I 14 I Start of Call Initiation I I I STOP I 15 I Stop after completion of all I I I I I Calls in progress. I +------------+-------------+---------+-----------------------------+

I Commands forI SUBD I 16 I Data and Phone Number per Line I I Call I LINK I 17 I Link Data, not used in EST I I Handling I BLOC I 18 I Blocking of EST Line I I I DEBL I 19 I Deblocking of EST Line I I I STON I 20 I Trace tone, not used in EST I +------------+-------------+---------+-----------------------------+

I Commands I CALC I 21 I Display of Statistical CountersI I for I STFB I 23 I Display of a Message from the I I Statistics I I I 32-cell Message Buffer. I +------------+-------------+---------+-----------------------------+

I Service I DISP I 27 I Display of the Program Store I I Commands I I I and control of Checksum. I I I SCAN I 29 I Dynamic display of data, EST- I I I I I Alarm List and Processor Load. I I I COMP I 30 I Conversion of Hex/Dec, v.v. I I I SOFF I 31 I Stop of Audiable signal, I I I I I not used in EST. I +------------+-------------+---------+-----------------------------+

4.1 Description

If a parameter or a command has been incorrectly keyed, the command panel must be cleared with the 'CLMP' key and the command with parameters must be re-entered. Note that between pushing of keys a time supervision of 10 seconds is in effect. If the 10 second supervision has elapsed the command panel will clear automatically.

With a 'Dynamic Display' is meant a Display that is updated continuously in 100 ms intervalls.

ONE key to press is indicated by an UNDERSCORE. The () indicate that the parameter is optional.:xmp nokeep tab=0. CONF EXEC Display current configuration. - -

CONF a.b(.c) EXEC Set new configuration - --- -- - (Not used in EST) a = 2 Meaning EST with Display Panel b = 1 Meaning 16 Lines c = 0 or left out Meaning International Dial ----------

RESTA 0.0 EXEC Restart; unchanged configuration - --- -

RESTA a.b(.c) EXEC Restart; set new configuration - --- -- - (Not used in EST) a, b and c See command CONF ----------

TIME EXEC Dynamic display of the - - Real Time Clock TIME aa.bb.cc EXEC Set new time, followed by - -------- - dynamic display (24 h Clock) aa = 00-23 Hours bb = 00-59 Minutes cc = 00-59 Seconds Leading zeroes may NOT be omitted ----------

LIM1 aa EXEC Changing of Limit 1 in EST for - -- - Dialtone Delay aa = 01 - 15 Response '0' = Accepted Leading zero may be omitted

---

```
LIM2  aa EXEC                          Changing of Limit 2 in EST for
-     -- -                             Dialtone Delay
      aa = 01 - 15                     Response '0' = Accepted
                                       Leading zero may be omitted
-------------------------------------------------------------------------
DTSR  EXEC                             Static display of Dialpulse,
-     -                                make/break ratio and DTMF
      ........................         dialing data.
      . a a      g g g.h h h .         ggg = real make time in ms
      ........................         hhh = real break time in ms
      ........................
      . d d d    e e e.f f f .         for aa, ddd, eee, fff and
      ........................             bb, cc - see below.
      ...........
      .     b b .
      ...........
      ...........
      .     c c .
      ...........
DTSR  aa.bb.cc.ddd  EXEC               Set new Dialpulse speed and
-     ------------  -                  make/break Ratio in %.
      aa = 7 - 22                      Pulses/second
      bb = 20 - 80                     Make ratio in %  ) Sum MUST
      cc = 20 - 80                     Break ratio in % ) be=100.
      ddd = 100 - 999                  Interdigital pause in ms
DTSR  C.eee.fff  EXEC                  Set new DTMF data
-     ---------  -
      C   = 'CODE'                     (DTMF)
      eee = 10-100                     tone pulse time in ms
      fff = 50-990                     tone pause time in ms
                                       Leading zeroes may be omitted for a-f.
                                       For d, e and f.The last digit is
                                       always assumed to be '0'.
DTSR  C.0  EXEC                        Change of all configured lines
-     ---  -                           from DTMF signaling to
                                       pulsed digit transmission.
DTSR  C.1  EXEC                        Change of all configured lines
-     ---  -                           from pulsed digit transmission
                                       to DTMF signaling.
```

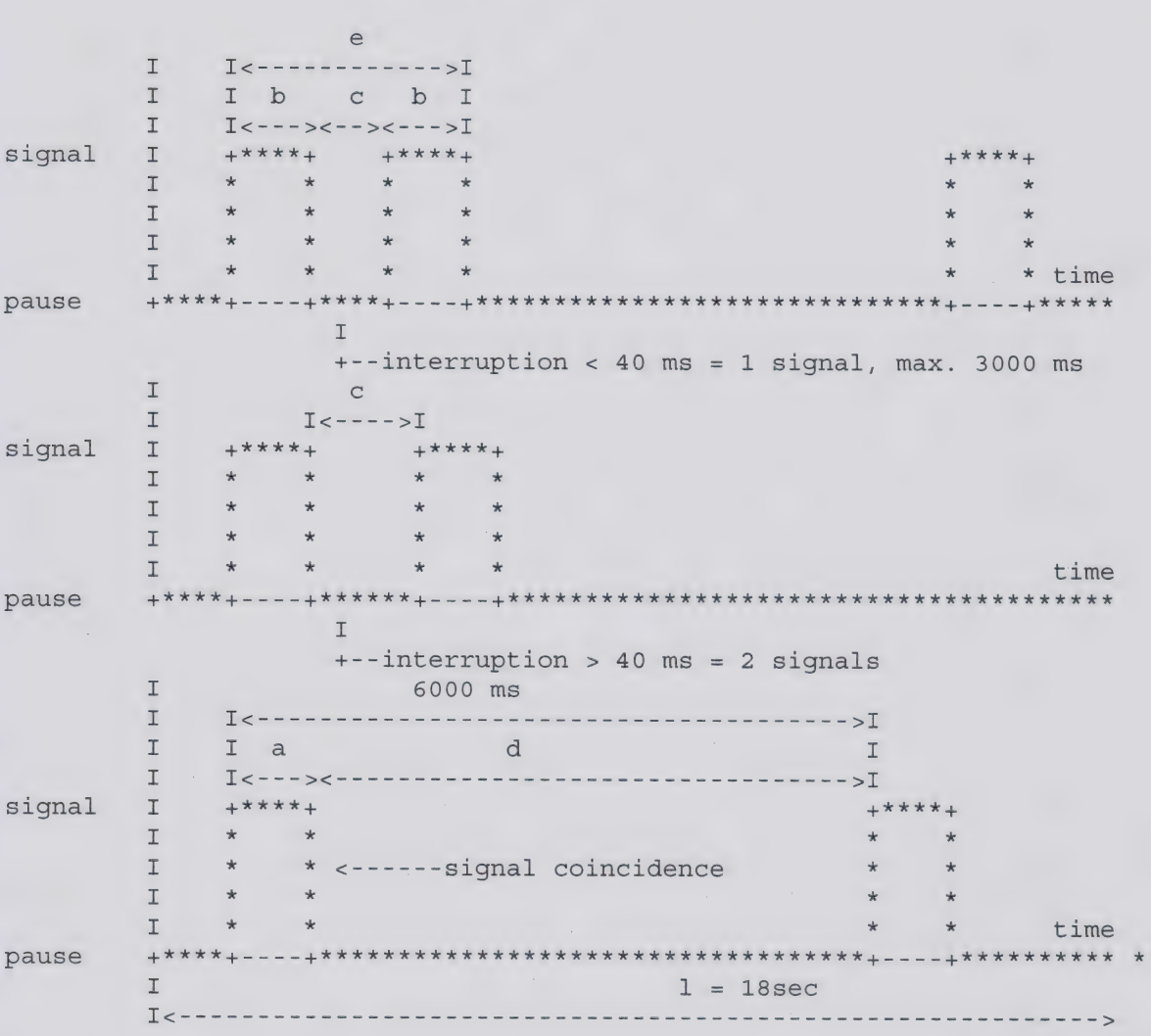
```
TONC  a  EXEC                          Reset tone characters 1-4 to
-     -  -                             standard data.
TONC  a.b  EXEC                        Display of tone/pause element
-     ---  -                           data.
TONC  a.1.ccc.0.0.ggggg  EXEC          Set continuous tone and
-     -----------------  -             recognition time.
TONC  a.b.ccc.ddd.eee.fff  EXEC        Set tone/pause element data.
-     -------------------  -
TONC  a.b.ccc.ddd.0.ggggg  EXEC        Set LAST tone/pause element data
-     -------------------  -           and recognition time.
```

```
a = 1-8                          Tone character 1 = dial tone
                                                2 = 2nd dial tone
                                                3 = ringing tone
                                                4 = ringing signal
                                              5-8 = code answer tones,
                                                    not used in EST.
b = 1-5                          Tone/pause element within tone
                                 character.
ccc = 4-999                      Minimum time for tone
ddd = 8-999                      Maximum time for tone
eee = 4-999                      Minimum time for pause
fff = 8-999                      Maximum time for pause
ggggg = 4-65535                  Recognition time for tone
                                 character
                                 Leading zeroes may be omitted for
                                 c-g.  All values in units of 10 ms
                                 The total supervision time of the
                                 tone characters must not exceed
                                 the total supervision time of a
                                 call.
The tone/pause elements must be loaded in numerical order (1-5).
Example: Element no. 3 cannot be loaded if elements 1 and 2
have not been loaded previously.
```

```
Example 1
---------
Dial tone 2.4 s, continuous tone, recognition time 6 s.
        I
        I
        I                                        I     I
tone    I        +********************************+*****+
        I        *                               I     I
        I        *                               I     I
        I        *                               I     I
        I        *                               I     I
        I        *                               I     I
        I        *                               I     I
        I        *                               I     I
pause   I********+-------------------------------+-----+--  time
        I        I                               I     I
        I   A    I         2.4s                  I     I
        I<------>I<----------------------------->I     I
        I                                              I
        I           6.0s                               I
        I<-------------------------------------------->I
        I
If the tone is interrupted before the time 2.4 s or if the
initial delay A is larger than 6000-2400 = 3600 ms, a fault
is indicated. On the other hand, if the 2.4 s  tone is
received the tone is approved and the measuring of 6s is
interrupted.
Command:   TONC  1.1.240.0.0.600  EXEC
           -     ---------------  -
Example 2
---------
Ringing signal TVT. One signal of 1 s every 6 seconds.
Two signals are to be received within 18s.
The first ringing signal and intermittent ringing may coincide.
Signal tolerance: 600-1500 ms
The following figures show that the following data is
to be set:
```

```
1st ringing signal: 600-3000 ms
Pause: 40-5400 ms (Min: 40 ms = the shortest time EST measures,
                   Max: 5400 = 6000-600 ms).
2nd ringing signal: 600-1500 ms
Recognition time:  18000 ms
```

```
Command 1:  TONC  4.1.60.300.4.540  EXEC
            -     ----------------  -
                      a   e  c  d
Command 2:  TONC  4.2.60.150.0.1800  EXEC
            -     -----------------  -
                      a   b     l
```




```
a = Min. signal:     600 ms
b = Max. signal:    1500 ms
c = Min. pause:       40 ms
d = Max. pause:     6000-600 = 5400 ms
e = Max. 1st signal: 1500 + 1500 = 3000 ms
l = Recognition time: If two signals have not arrived within the
                      proper tolerances and a correct pause has
                      not been indicated within 18 sec,
                      a fault will be registered.
```

```
CARA    EXEC                        Display of Call Initiation Rate
-       -

                                    Example:  07.10.00.02
                                    07 = aa   (static)
                                    10 = bb   (static)
                                    00 =      Calls in upcounting
                                              buffer (dynamic)
                                    02 =      Calls in generating
                                              buffer (dynamic)
CARA    aa  EXEC                    Set new Call Initiation Rate
-       --  -
CARA    aa.bb  EXEC                 Set Call Rate and Peak Factor
-       -----  -                    (Can be used while traffic is
                                     running).
        aa = 0 - 13                 Call Rate Initiation Code
                                    0 = 0   Calls per Minute
                                    1 = 1           "
                                    2 = 2           "
                                    3 = 3           "
                                    4 = 6           "
                                    5 = 15          "
                                    6 = 30          "
                                    7 = 60          "
                                    8 = 90          "
                                    9 = 120         "
                                   10 = 150         "
                                   11 = 180         "
                                   12 = 240         "
                                   13 = 300         " (=18000/hour)
        bb = 0 - 15                 Peak Factor for Initiation Rate
                                    Leading zeroes may be omitted for
                                    a and b.  The highest Call Rate
                                    can only be utilized with DTMF
                                    Digit Transmission on 128 Lines.
```

```
REGQ    EXEC                        Dynamic display of the number of
-       -                           available calls towards the switch.
-------------------------------------------------------------------------
SUPV    EXEC                        Static display of supervision
-       -                           time and type of release control
SUPV    aaa(.b)  EXEC               Set supervision time and type of
-       --- --   -                  release control.
        aaa = 1 - 120               Supervision time in sec.
        b = 0 or omitted            No release control
            1                       Release from A subscriber.
            2                       Release from A subscriber after
                                    check from B
            3                       Last Party Release after
                                    check from B and A.
                                    Leading zeroes may be omitted for a.
-------------------------------------------------------------------------
TTYP    EXEC                        Static display of Test and Fault
-       -                           Handling Type.
                                    '4' = Load Test
                                    '1' = Recording of Faults
-------------------------------------------------------------------------
START   EXEC                        Start call handling, all Data saved
-       -                           (Used after short Stop)
START   0  EXEC                     Start Call Handling after clearing all
-       -  -                        Statistical Counters and Message Buffer
-------------------------------------------------------------------------
```

```
STOP    EXEC                        Complete all Calls in progress
-       -                           and stop Call Handling
```

```
SUBD    aaa  EXEC (...EXEC)         Dynamic supervision of
-       ---  -        -            EST-line = aaa
        aaa = 5 - 16                Leading zeroes may be omitted
                                    Example of Display:
                                    +----------------------+
                                    I      08.7190000      I
                                    I      3.2.0.0.4.9.035 I
                                    I  X   A022            I
                                    I  X   B004            I
                                    +----------------------+
                                    08.7190000 = Area code and
                                    directory number for EST-line=aaa.
                                    3 = see b below
                                    2 = see c below
                                    0 = Tone Testpoint, 0 = no signal
                                    0 = Call Identification not ready
                                        1 = ready
                                    4 = Sequence Number of digit
                                        under transmission
                                    9 = Value of digit under
                                        transmission
                                  035 = STATE value.
                                    X = # means Fault State on line
                                    A = dynamic indication how line
                                        = aaa is used momentarily
                                        A means A-sub, B means B-sub.
                                        0 means idle line, blocked
                                        1 means idle line, not blocked
                                  022 = aaa
                                    X = # means Fault State on line
                                    B = see above for A
                                  004 = dynamic indication of line
                                        number momentarily linked
                                        to aaa.
                                    Repeated pressing of EXEC steps
                                    to the next line provided EST
                                    has been stopped previously.
```

```
SUBD    aaa.b.c.ddd.eeeeeee  EXEC   Set telephony data per EST-line and
-       -------------------  -      display the result, cleared by CLMP
     aaa = 5 - 16                   EST Line number
       b = 1                        Line used as A-sub only
           2                        Line used as B-sub only
           3                        Line used both as A- and B-sub
       c = 0                        If b=2 can c=0 be used
           1                        Pulse dialing if used as A-sub
           2                        DTMF dialing if used as A-sub
       d, e                         Area code and/or directory
                                    number, max 10 digits in total.
                                    'dot' indicates waiting point
                                    for 2nd dialtone, if needed.
                                    Leading zeroes may be omitted for aaa
-------------------------------------------------------------------------
LINK                                Not used in EST.
-
```

```
-------------------------------------------------------------------------
BLOCK  aaa  EXEC                    Block EST line with number = aaa.
-      ---  -
       aaa = 5 - 16                 Leading zeroes may be omitted.
-------------------------------------------------------------------------
DEBL   aaa  EXEC                    Deblock EST line with number = aaa.
-      ---  -
       aaa = 5 - 16                 Leading zeroes may be omitted.
DEBL   EXEC                         Deblock all lines
-      -                            Should not be used in EST
-------------------------------------------------------------------------
STON                                Not used in EST.
-
```

```
CALC   EXEC (...EXEC)               Dynamic display of the Statistical
-      -       -                    Counters.
      ......................
      . a a a a a a        .        a = total number of initiated
      ......................            calls, max 999 999.
      ......................
      . f f f f f f        .        f = total number of faults,
      ......................            max 999 999.
      ..........
      .   A F  .                    AF = indicates that the total
      ..........                         counters for calls and fault
      ..........                         are displayed.
      .        .
      ..........
     After pressing EXEC another time the following is displayed:
      ......................        b = total number of successful
      . b b b b b b        .            calls to B-subscriber,
      ......................            max 999 999
      ......................
      . c c c c c c        .        c = Code Answer Calls,
      ......................            not used in EST.
      ..........
      .   B C  .                    BC = indicates  that the total
      ..........                         counters for B-terminated
      ..........                         and Code Answer Calls
      .        .                         are displayed.
      ..........
     On each subsequent pressing of EXEC a shift is made in the
     display between 'AF' and 'BC'.
```

```
CALC   F.1  EXEC                    Dynamic display of the number of
-      ---  -                       Faults per Fault Type.
      ......................
      . g g g g g          .        g = Total number of Faults per
      ......................            Fault Type, max. 65 535.
      ......................
      .                    .        '1' can be replaced by 1-21
      ......................
      ..........
      . F 0 0 1 .                   F = indicates Fault Counter
      ..........                    1 = indicates Type of Fault
      ..........                    (As listed in Section 6.1)
      .        .
      ..........
```

```
      Repeated pressing of EXEC steps the display to the next
      Fault Counter in turn.
CALC   ddd  EXEC                    Dynamic display of the number of
-      ---  -                       initiated connections and the
                                     number of faults per indicated line.
      ......................
      . e e e e e          .        e = number of calls for the
      ......................            indicated line, max. 65 535.
      ......................
      . h h h h h          .        h = fault counter for the
      ......................            indicated line, max. 65 535.
      ..........
      .   d d d .                   d = line number in EST
      ..........
      ..........
      .         .
      ..........
      Repeated pressing of EXEC steps the display to the counters
      of the next line in turn.
```

```
STFB   EXEC                         Dynamic display of the number of
-      -                            loaded buffer cells
STFB   0  EXEC                      Clear all buffer cells.
-      -  -
STFB   E.aa  EXEC (...EXEC)         Static display of a buffer cell
-      ----  -       -              with Line Numbers in EST.
      ......................
      . b b b              .        b = Number of A-line in EST
      ......................
      ......................
      . c c c              .        c = Number of B-line in EST
      ......................
      ..........
      . a a f f .                   aa = buffer cell number
      ..........                    ff = Fault Code (as listed
      ..........                              in Section 6.1)
      . t t m m .                   tt = hours
      ..........                    mm = minutes
STFB   D.aa  EXEC (...EXEC)         Static display of a buffer cell
-      ----  -       -              with Directory Numbers.
      ......................
      . b b - - - - - - - b .       bb = A-sub Directory Number.
      ......................
      ......................
      . c c - - - - - - - c .       cc = B-sub Directory Number.
      ......................
      ..........
      . a a f f .
      ..........
      ..........
      . t t m m .
      ..........                    aa, ff, tt, mm, see above
      For certain messages b and c as above are not indicated.
      Repeated pressing of EXEC steps aa and will display the next
      buffer cell.
```

```
DISP   EXEC (...EXEC)  CLMP          Control of the Checksum per
-      -       -       -             Program Page, shall be #55.
```

```
                                    All the PS pages are checksummed
                                    in sequence with a simultaneous
                                    display of the number of the page
                                    being checksummed. In case of a
                                    fault the faulty Checksum is shown
                                    on the  Hexadecimal displays and
                                    the test stops. By pressing EXEC
                                    the test will continue. The command
                                    is rejected while Traffic Handling
                                    is in progress.(Time consuming).
DISP   #abbb  EXEC (...EXEC)       Static display of the Instruction
-      -----  -        -          Code per halfword on PS page = a
                                    and at Address = bbb.
                                    Repeated pressing of EXEC
                                    steps to the next Address.
       a = 0-F
       bbb = 000-3FF if a=0         Leading zeroes may NOT be
             400-7FF if a=1-F       omitted.
-------------------------------------------------------------------------
COMP   #aaaa  EXEC                  Conversion of Hexadecimal
-      -----  -                     number to Decimal.
       aaaa = 0000-FFFF             Leading zeroes may NOT be omitted
COMP   bbbbb  EXEC                  Conversion of Decimal number
-      -----  -                     to Hexadecimal.
       bbbbb = 0 - 65535            Leading zeroes may be omitted
-------------------------------------------------------------------------
SCAN   EXEC                         Dynamic display of Average
-      -                            Processor Load over 100
                                    Primary Intervals (1 sec),
                                    expressed in percent, 01-99.
SCAN   #0aaa  EXEC (...EXEC)        Dynamic display of halfword
-      -----  -        -          from Data Store at Address = aaa
                                    Repeated pressing of EXEC steps
                                    to the next Address.
       aaa = 000-FFF                Leading zeroes may NOT be omitted
-------------------------------------------------------------------------
SOFF   EXEC                         Not used in EST.
-      -
```

---

5 Messages:h2.Flash Codes:xmp nokeep tab=1.

For Manual Start, all Flashcodes must be cleared with 'CLMP' ----------

FLASH- IMPORTANT EVENT OR SERIOUS FAULT -CODE ----------

F01 No Fault. The code indicates that the Upstart after Power On has been terminated. F02 No Fault. The code indicates that a regular Restart has been terminated, either manually ordered with RESTA or by the System itself. F03 A Restart has been made due to an illegal change of the 3rd Parameter of the Configuration - the Dialsystem. Not Self-healing. Remedy: 30 sec Power Down. F04 A Restart has been made due to Program Handling Alarm. Happens extremely seldom, is triggered by a faulty PROM in PS and will probably reoccur. Find the faulty PS-board with the Command DISP (Checksum) and replace. F05 A Restart has been made due to a Parity Failure in DS. If the code occurs intermittently, the DS-board in pos. 38 should be replaced (Faulty RAM). The DS-board can also be tested with T-EST - if available. If EST is equipped with Aut.Start and F05 persists, this can depend upon that a very short Powerbreak occurred. Due to residual charges in the capacitors of the Power Units, Power Down times of 1-10 sec.

can in extreme cases cause Parity Failure in that portion of DS, not cleared by a Restart. As a consequence the Processor 'loops' in a 'Parity Failure' Restart. Remedy: Make a (remote) Power Down of at least 30 seconds, followed by a Power On. This will clear ALL of DS. F09 A fault has been made in Command TIME, setting the Real Time Clock out of range. Press CLMP and try again. (24 hour clock, range 00.00.00 to 23.59.59)

5.1 Response Codes

The following Response Codes can be encountered on the
display after entering a Command -:xmp nokeep tab=1. ----------

Response Message Code ----------

Flashing Your Command has been keyed wrong or incomplete, 'NOT ACC' prescribed limits have been superseded, the command (LED in the is out of sequence or leading zeroes have been upper left omitted when not allowed. corner) Your Command is 'NOT ACCEPTED' by EST. Please check the command description. 0 Command executed - OK (LIM1, LIM2) 01 Wrong Configuration 10 No Testtype/Faulthandling Type set (Not used in EST) 11 (No) Traffic handling in progress (START, STOP) 13 Buffer cell not loaded (STFB) 20 Line already blocked (BLOCK) 21 Line already deblocked (DEBL) 24 Deblocking not allowed with FM-type=1 (Not used in EST) 25 No data loaded for this line (SUBD) 30 Preceeding element not loaded (TONC) 31 Wrong combination (TTYP) (Not used in EST) 32 Command not in harmony with Test Type

Response Codes 1-9, 02-05, 23, 26, and 33-42 have no relevance to EST and can be cleared and ignored if these should appear. They only indicate that a fault has been made in a previous Command. Please check the CONFIGURATION (should be 2.1.0). The machine cannot be used with an incorrect Configuration.:np.:h1.Fault Handling

All faults encountered by EST during Call Setup are handled in the following 2 ways -

A. Alarms for Dialtone delay are extended to an Alarm
Interface as described under Sections 3.3 and 3.6

B. All other Faults encountered during Call Handling
will be entered in the form of coded Messages
into a 32-cell Message Buffer and collected in
different sets of Statistical Counters.

The different recognisable Faulttypes have been
listed under Section 6.1 below. The Message Buffer
can be displayed with Command STFB and the Statistical
Counters with the Command CALC:h2.Fault- and Message Codes

The following Faulttypes are recognized by EST